

SEQUENCE LISTING

<110> Cox III, George Norbert
 Case, Casey Christopher
 Eisenberg, Stephen P.
 Jarvis, Eric Edward
 Spratt, Sharon Kaye
 Sangamo Biosciences, Inc.

<120> Regulation of Endogenous Gene Expression in Cells Using
 Zinc Finger Proteins

<130> 019496-002200US

<140> 09/229,037
 <141> 1999-01-12

<160> 40

<170> PatentIn Ver. 2.0

<210> 1
 <211> 25
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:exemplary motif
 of C2H2 class of zinc finger proteins (ZFP)

<220>
 <221> MOD_RES
 <222> (2)..(3)
 <223> Xaa = any amino acid

<220>
 <221> MOD_RES
 <222> (4)..(5)
 <223> Xaa = any amino acid, may be present or absent

<220>
 <221> MOD_RES
 <222> (7)..(18)
 <223> Xaa = any amino acid

<220>
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 <222> (20)..(22)
 <223> Xaa = any amino acid

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 <222> (23)..(24)
 <223> Xaa = any amino acid, may be present or absent

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 Cys Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15
 Xaa Xaa His Xaa Xaa Xaa Xaa Xaa His
 20 25

102020 "44526360

<220>
 <221> modified_base
 <222> (8)
 <223> n = g,a,c or t

<400> 3
 nngkngkngk

10

<210> 4
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 4
 Asp Gly Gly Gly Ser
 1 5

<210> 5
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 5
 Thr Gly Glu Lys Pro
 1 5

<210> 6
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 6
 Leu Arg Gln Lys Asp Gly Glu Arg Pro
 1 5

<210> 7
 <211> 4
 <212> PRT
 <213> Artificial Sequence

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 <223> Description of Artificial Sequence:linker

<400> 7
 Gly Gly Arg Arg
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TC2020-44B26350

<210> 8
 <211> 5
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 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 8
 Gly Gly Gly Gly Ser
 1 5

<210> 9
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 9
 Gly Gly Arg Arg Gly Gly Gly Ser
 1 5

<210> 10
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 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

<400> 10
 Leu Arg Gln Arg Asp Gly Glu Arg Pro
 1 5

<210> 11
 <211> 12
 <212> PRT
 <213> Artificial Sequence

<220>
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<400> 11
 Leu Arg Gln Lys Asp Gly Gly Gly Ser Glu Arg Pro
 1 5 10

<210> 12
 <211> 16
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:linker

09897844-070201

<400> 12

Leu Arg Gln Lys Asp Gly Gly Gly Ser Gly Gly Gly Ser Glu Arg Pro
 1 5 10 15

<210> 13

<211> 25

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:ZFP target site
 region surrounding initiation site of vascular
 endothelial growth factor (VEGF) gene containing
 two 9-base pair target sites

<220>

<221> protein_bind

<222> (4)..(12)

<223> upstream 9-base pair ZFP VEGF1 target site

<220>

<221> protein_bind

<222> (14)..(22)

<223> downstream 9-base pair ZFP VEGF3a target site

<400> 13

agcggggagg atcgcggagg cttgg

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<210> 14

<211> 298

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:VEGF1 ZFP
 construct targeting upstream 9-base pair target
 site in VEGF promoter

<220>

<221> CDS

<222> (2)..(298)

<223> VEGF1

<400> 14

g gta ccc ata cct ggc aag aag aag cag cac atc tgc cac atc cag ggc 49
 Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
 1 5 10 15

tgt ggt aaa gtt tac ggc aca acc tca aat ctg cgt cgt cac ctg cgc 97
 Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu Arg
 20 25 30

tgg cac acc ggc gag agg cct ttc atg tgt acc tgg tcc tac tgt ggt 145
 Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
 35 40 45

aaa cgc ttc acc cgt tgc tca aac ctg cag cgt cac aag cgt acc cac 193
 Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
 50 55 60

T02020"4426860

acc ggt gag aag aaa ttt got tgc ccg gag tgt ccg aag cgc ttc atg 241
 Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
 65 70 75 80

cgt agt gac cac ctg tcc cgt cac atc aag acc cac cag aat aag aag 289
 Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
 85 90 95

ggt gga tcc 298
 Gly Gly Ser

<210> 15

<211> 99

<212> PRT

<213> Artificial Sequence

<400> 15

Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
 1 5 10 15

Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu Arg
 20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
 35 40 45

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
 50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
 65 70 75 80

Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
 85 90 95

Gly Gly Ser

<210> 16

<211> 298

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: VEGF3a ZFP
 construct targeting downstream 9-base pair target
 site in VEGF promoter

<220>

<221> CDS

<222> (2)..(298)

<223> VEGF3a

<400> 16

g gta ccc ata cct ggc aag aag aag cag cac atc tgc cac atc cag ggc 49
 Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
 1 5 10 15

VEGF3a ZFP

tgt ggt aaa gtt tac ggc cag tcc tcc gac ctg cag cgt cac ctg cgc 97
 Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg
 20 25 30

tgg cac acc ggc gag agg cct ttc atg tgt acc tgg tcc tac tgt ggt 145
 Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
 35 40 45

aaa cgc ttc acc cgt tcg tca aac cta cag agg cac aag cgt aca cac 193
 Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
 50 55 60

acc ggt gag aag aaa ttt gct tgc ccg gag tgt ccg aag cgc ttc atg 241
 Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
 65 70 75 80

cga agt gac gag ctg tca cga cat atc aag acc cac cag aac aag aag 289
 Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
 85 90 95

ggt gga tcc 298
 Gly Gly Ser

<210> 17
 <211> 99
 <212> PRT
 <213> Artificial Sequence

<400> 17
 Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
 1 5 10 15

Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg
 20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
 35 40 45

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
 50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
 65 70 75 80

Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
 85 90 95

Gly Gly Ser

<210> 18
 <211> 29
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: VEGF DNA target
 site 1 recognition (top) strand

002020-4426860

<220>
<223> Description of Artificial Sequence:primer SPE7

<400> 22
gagcagaatt cggcaagaag aagcagcac 29

<210> 23
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer SPEamp12

<400> 23
gtggtctaga cagctcgtca cttcgc 26

<210> 24
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer SPE
amp13

<400> 24
ggagccaagg ctgtggtaaa gtttacgg 28

<210> 25
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer SPEamp11

<400> 25
ggagaagctt ggatcctcat tatccc 26

<210> 26
<211> 83
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:sequence
ligated between XbaI and StyI sites

<400> 26
tctagacaca tcaaaaccca ccagaacaag aaagacggcg gtggcagcgg caaaaagaaa 60
cagcacatat gtcacatcca agg 83

<210> 27
<211> 39
<212> DNA
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09397344.070301

<220>

<223> Description of Artificial Sequence:primer GB19

<400> 27

gccatgccgg tacccataacc tggcaagaag aagcagcac

39

<210> 28

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer GB10

<400> 28

cagatcggat ccacccttct tattctggtg ggt

33

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<211> 589

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:designed
6-finger ZFP VEGF3a/1 from KpnI to BamHI

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<223> VEGF3a/1

<400> 29

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Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly

1

5

10

15

tgt ggt aaa gtt tac ggc cag tcc tcc gac ctg cag cgt cac ctg cgc 97

Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg

20

25

30

tgg cac acc ggc gag agg cct ttc atg tgt acc tgg tcc tac tgt ggt 145

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly

35

40

45

aaa cgc ttc aca cgt tgc tca aac cta cag agg cac aag cgt aca cac 193

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His

50

55

60

aca ggt gag aag aaa ttt gct tgc ccg gag tgt ccg aag cgc ttc atg 241

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met

65

70

75

80

cga agt gac gag ctg tct aga cac atc aaa acc cac cag aac aag aaa 289

Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys

85

90

95

gac ggc ggt ggc agc ggc aaa aag aaa cag cac ata tgt cac atc caa 337

Asp Gly Gly Gly Ser Gly Lys Lys Lys Gln His Ile Cys His Ile Gln

100

105

110

T0202044B26860

ggc tgt ggt aaa gtt tac ggc aca acc tca aat ctg cgt cgt cac ctg 385
 Gly Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu
 115 120 125

cgc tgg cac acc ggc gag agg cct ttc atg tgt acc tgg tcc tac tgt 433
 Arg Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys
 130 135 140

ggt aaa cgc ttc acc cgt tcg tca aac ctg cag cgt cac aag cgt acc 481
 Gly Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr
 145 150 155 160

cac acc ggt gag aag aaa ttt gct tgc ccg gag tgt ccg aag cgc ttc 529
 His Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe
 165 170 175

atg cgt agt gac cac ctg tcc cgt cac atc aag acc cac cag aat aag 577
 Met Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys
 180 185 190

aag ggt gga tcc 589
 Lys Gly Gly Ser
 195

<210> 30

<211> 196

<212> PRT

<213> Artificial Sequence

<400> 30

Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
 1 5 10 15

Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg
 20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
 35 40 45

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
 50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
 65 70 75 80

Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
 85 90 95

Asp Gly Gly Gly Ser Gly Lys Lys Lys Gln His Ile Cys His Ile Gln
 100 105 110

Gly Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu
 115 120 125

Arg Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys
 130 135 140

Gly Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr
 145 150 155 160

09097844-070201

His Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe
 165 170 175
 Met Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys
 180 185 190
 Lys Gly Gly Ser
 195

<210> 31
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 <212> DNA
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<220>
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 target oligonucleotide

<400> 31
 agcgagcggg gaggatcgcg gaggcttggg gcagccgggt ag 42

<210> 32
 <211> 42
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:JVF10 VEGF3a/1
 target oligonucleotide complementary sequence

<400> 32
 cgctctaccc ggctgcccga agcctccgcg atcctccccg ct 42

<210> 33
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:primer JVF24

<400> 33
 cgcggatccg cccccccgac cgatg 25

<210> 34
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
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 primer JVF25

<400> 34
 ccgcaagctt acttgatc gtcgtccttg tagtcgtgc cccaccgta ctggtcaatt 60

cc 62

1020204426550

<210> 35
 <211> 7
 <212> PRT
 <213> Simian virus 40

<220>
 <221> PEPTIDE
 <222> (1)..(7)
 <223> SV40 large T antigen nuclear localization sequence
 (NLS)

<400> 35
 Pro Lys Lys Lys Arg Lys Val
 1 5

<210> 36
 <211> 61
 <212> DNA
 <213> Artificial Sequence

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 EcoRI to KpnI containing Kozak sequence including
 initiation codon and SV40 NLS

<400> 36
 gaattcgcta ggcaccacat ggcccccaag aagaagagga aggtgggaat ccatggggta 60
 c 61

<210> 37
 <211> 187
 <212> DNA
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<220>
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 KpnI to XhoI containing BamHI site, KRAB-A box
 from KOX1, FLAG epitope and HindIII site

<400> 37
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 gaggagtgga agctgctgga cactgctcag cagatcgtgt acagaaatgt gatgctggag 120
 aactataaga acctggtttc cttgggcagc gactacaagg acgacgatga caagtaagct 180
 tctogag 187

<210> 38
 <211> 277
 <212> DNA
 <213> Artificial Sequence

<220>
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 fragment from BamHI to HindIII sites

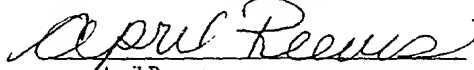
09037044 070201

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April Reeves

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

G.N. Cox III *et al.*

Application No.: 09/229,037

Filed: January 12, 1999

For: REGULATION OF ENDOGENOUS
GENE EXPRESSION IN CELLS
USING ZINC FINGER PROTEINS

Examiner: J. Lundgren

Group Art Unit: 1631

**REVOCATION OF POWER OF ATTORNEY
AND NEW POWER OF ATTORNEY**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

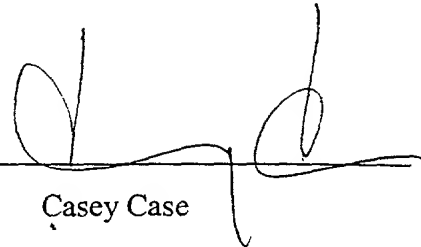
I, Casey Case, Vice President for Research of the assignee, Sangamo BioSciences, Inc. by virtue of an assignment recorded at Reel 010418 and Frame0960 on April 1, 1999 hereby revoke all powers of attorney heretofore existing in the above-identified application and hereby appoint Sean M. Brennan, Ph.D., Reg. No. 39,917, Dahna S. Pasternak, Reg. No. 41,411, Roberta L. Robins, Reg. No. 33,208 and Gary R. Fabian, Reg. No. 33,875 as our attorneys and agents to prosecute said application, and to transact all business in the Patent and Trademark Office connected therewith.

Please direct all further communications regarding this application to:

Sean Brennan,
Sangamo BioSciences, Inc.
501 Canal Blvd., Suite A100
Richmond, California 94804

Date: February 15, 2001

By:



Casey Case

09/229,037-442,6860